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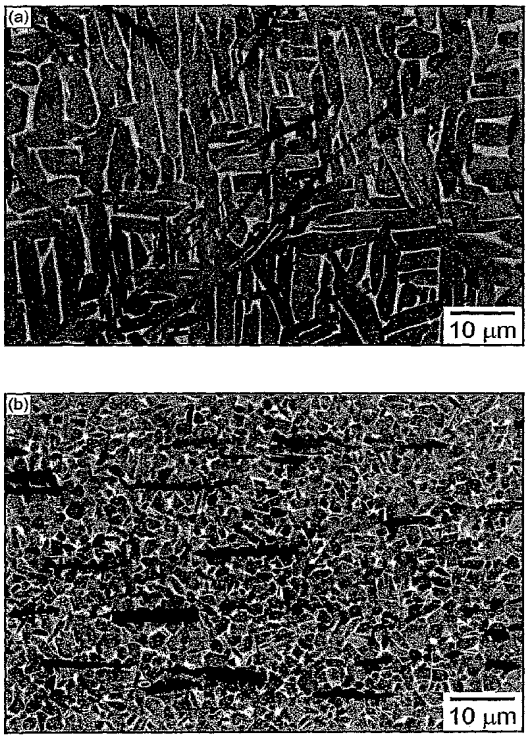
(54) Title: TITANIUM ALLOY MICROSTRUCTURAL REFINEMENT METHOD AND HIGH TEMPERATURE, HIGH STRAIN RATE SUPERPLASTIC FORMING OF TITANIUM ALLOYS



(57) Abstract: A method for refining the microstructure of titanium alloys in a single thermomechanical processing step, wherein the titanium alloy comprises boron. In some embodiments, the method comprises the steps of first adding boron to the titanium alloy then subjecting the boron-containing titanium alloy to a thermomechanical processing step. Also provided is a method for achieving superplasticity in titanium alloys comprising the steps of selecting a boron-containing titanium alloy, determining the temperature and strain rate necessary to achieve beta superplasticity, and applying sufficient temperature and strain rate to the boron-containing titanium alloy to deform the alloy to the desired shape. Also provided methods of forming titanium alloy parts and the parts prepared by these methods.

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